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RISK-WEIGHTED COST ESTIMATES - PRINCIPLES AND PRACTICAL APPLICATIONS

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Entergy

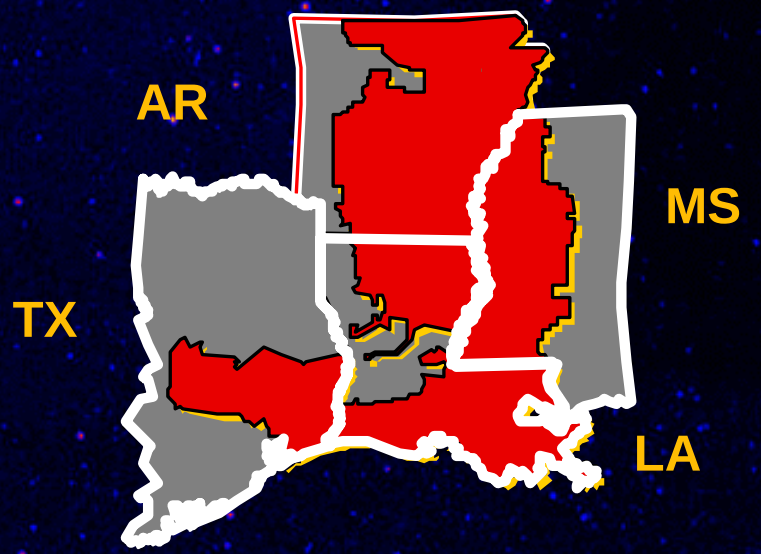
PMO LINK

Presentation Outline

- Company Overview
- Impacts of Deregulation (Capital Stewardship)
- Overview of Risk-Weighted Cost Estimating Process
- Use of Contingency to Support Continuous Risk Management
- Integration of Project Risk Management with Financial Risk Management
- Questions and Answers

The Entergy Corporation

- Headquartered in New Orleans, LA
- More than $10 Billion in Annual Revenues
- More than $25 Billion in Assets
- Major Functions
  - Generation Company
  - Transmission Company
  - Distribution Company
  - Retail Company
- More than 2.7 Million customers
- More than 25,000 megawatts capacity



Entergy Transmission

- More than 15,000 miles of Transmission lines (69 KV to 500 KV)
- Approximately 1000 substations
- Annual Capital Expenditure ($250 MM to $300 MM)
- Transmission Project Challenges = High Risk
- Aggressively pursuing Best Practices

Electricity Utility Market Changes

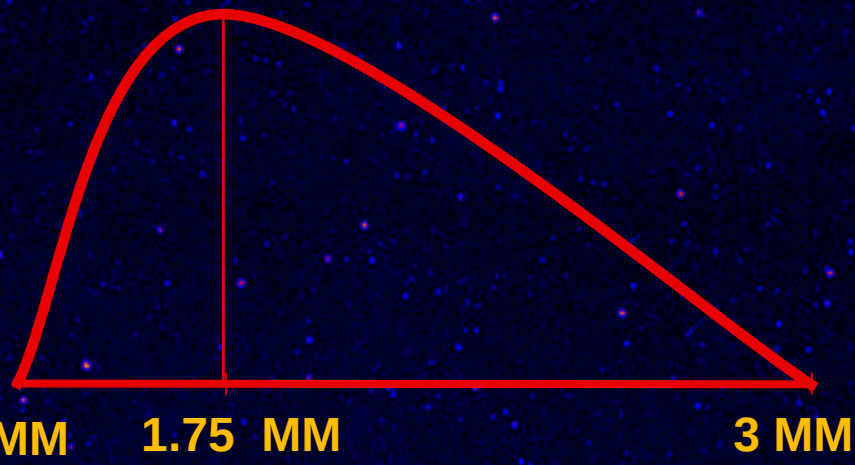
Regulated Market Pre 1990's	Deregulated Market
➢ Capital Investment Recovered Through Rate Base	➢ Performance Based Rates Higher Risk, Higher Return
➢ Lack of Competitive Pressures	➢ Effective Capital Deployment is Key
➢ Service Area Well Defined	➢ Influx of Independent Power Producers (IPPs)
➢ PSC Approved Rate Increases	➢ **Increased Project Management Involvement**
➢ Vertically Integrated Utilities	

Why Risk Weighted Cost Estimates?

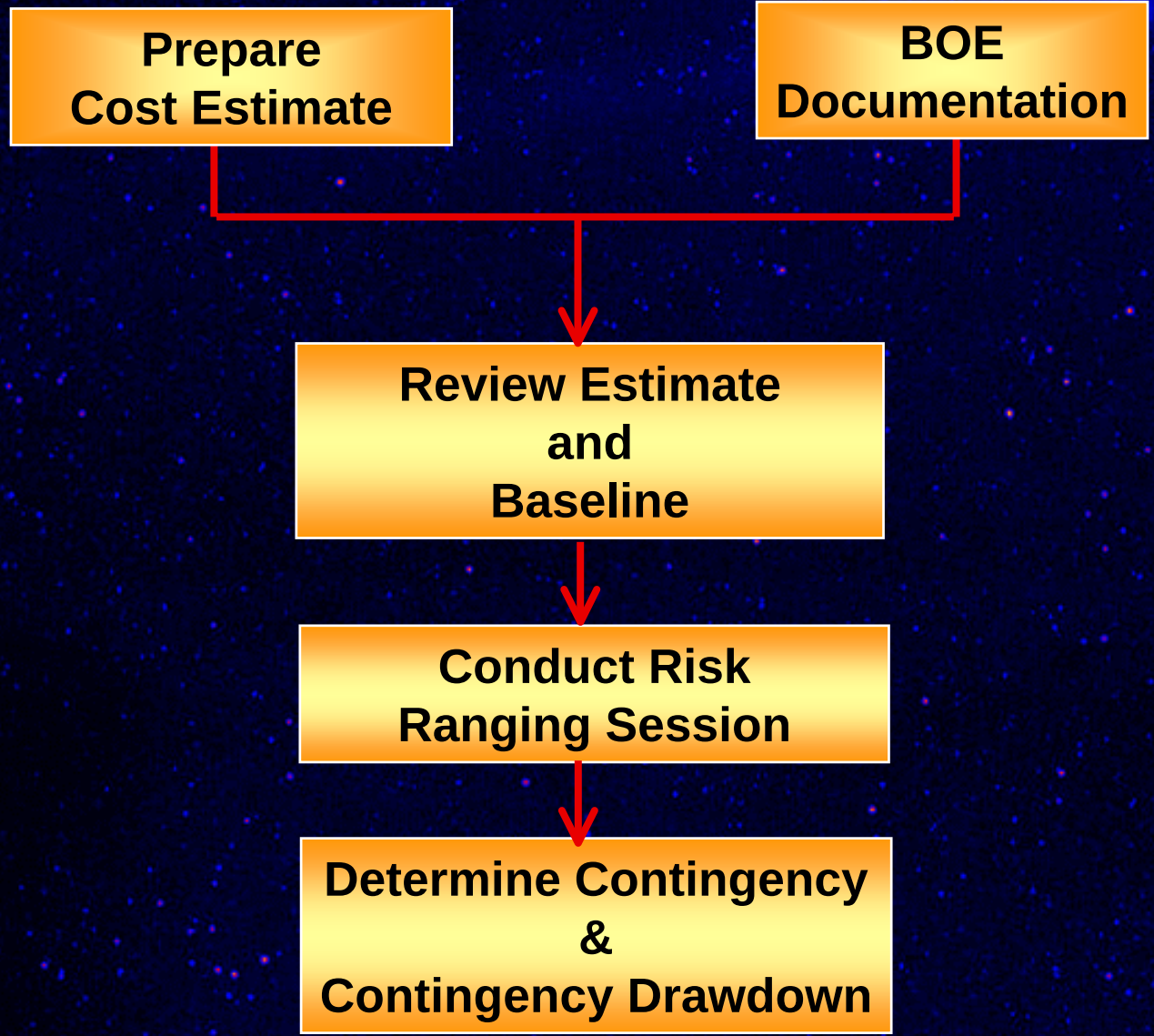
Single Value (Deterministic) Estimates

- Bid Evaluation
- Setting Budgets

There is Uncertainty in Cost Estimates



Risk-Weighted Cost Estimating



Base Cost Estimate

- Represents “Most Likely” Costs (Quotes, Historic Data, Manuals)
- Approaches “Best in Class”
- Lean with No Hidden Allowances
- Miscellaneous Costs or Allowances Justified
- Basis of Cost Estimate

Peer Review of Base Cost Estimate

- Peers are SME's (15+ yrs experience)
- Able to apply "sanity" check
- Participate in Estimate Reconciliation
- Share Lessons Learned with Project Team
- Cost Estimate data should be circulated ahead of Review

End Result is a baseline cost estimate

Risk Ranging Session Participants

- Project Manager
- Business Rep
- Discipline Leads
- Project Controls
- Contractor/Vendor
- Facilitator
- Scribe

Group Size Should Be Restricted To No More Than Ten

Completed Cost-Influence Factor Matrix

Description	Base Cost X1000 In US$		1 Design Risks	2 Testing Risks	3 Schedule Risks	4 Contract Risks
DESIGN						
Site Investigations	545	-	65		0	75% (0)
		+	150		1,500	25% (1300)
Electrical Design	500	-	150		120	
		+	200		500	
Relay Design	500	-	100		600	
		+	495		200	
Relay Settings	1,355	-	110		100	
		+	380		0	
CONSTRUCTION						
Site Work	1,540	-		85	175	
		+		390	35	
Equipment Installation	275	-		500		
		+		275		
Commissioning	285	-	200	200		
		+	142	200		
Effect on Total Estimate	5,000	-	625	785	1,030	75% (0)
		+	1,267	865	2,270	25% (1300)

Risk Analysis Models

Simple Monte Carlo Model

Risk-Weighted Cost Estimate = Base Cost + I1 + I2 + I3 + I4 + I5

Considerations

- **Correlation**
- **Number of Iterations**

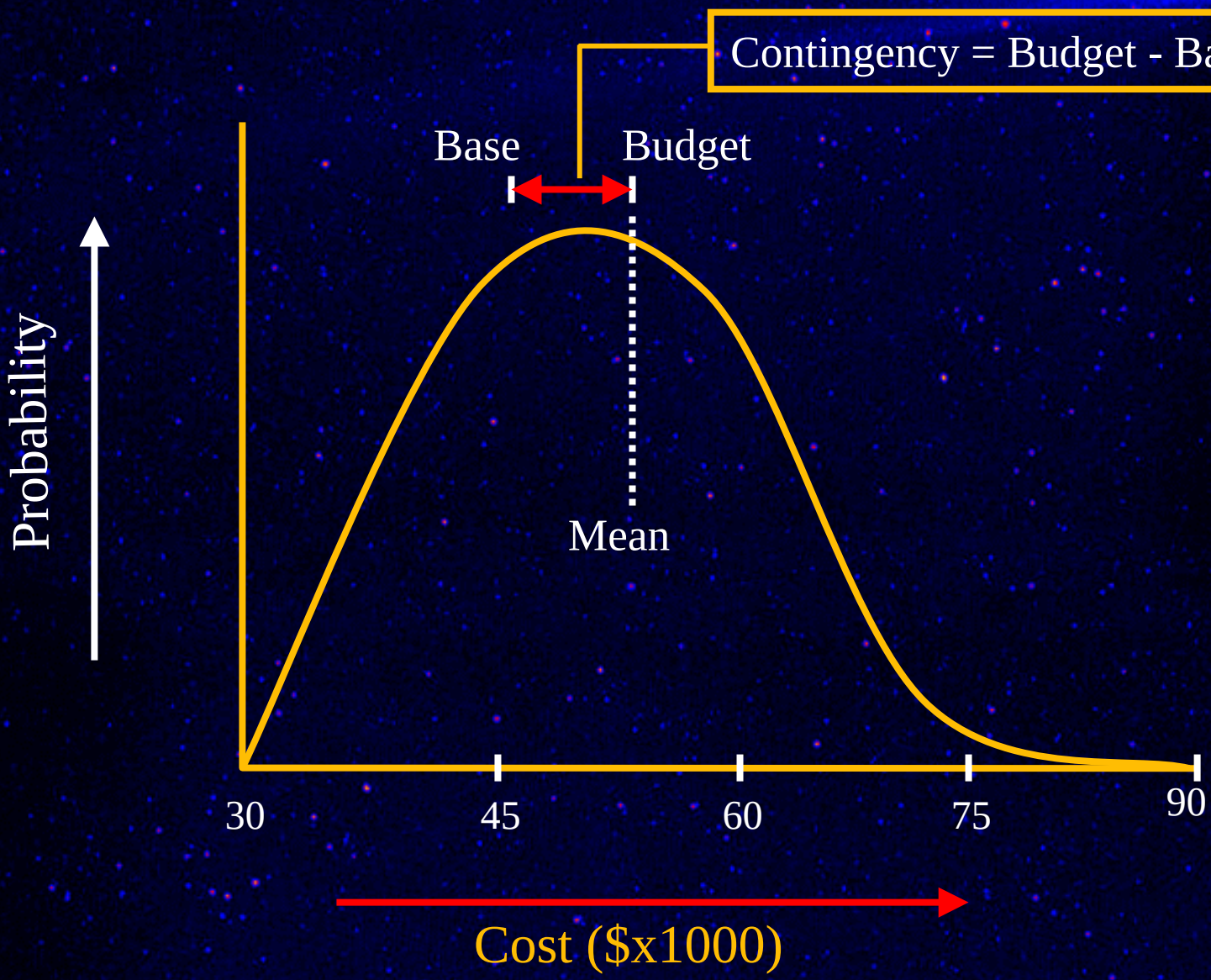
For Factored estimates, correlation between Influence Factors must be considered.

Risk Analysis Results

- Probabilistic Distribution of Costs
- Minutes of Ranging Session (Scribe Output)
- Sensitivity Data (Tornado Diagram)

Risk Analysis results are reviewed before release

Using Results to Set Contingency

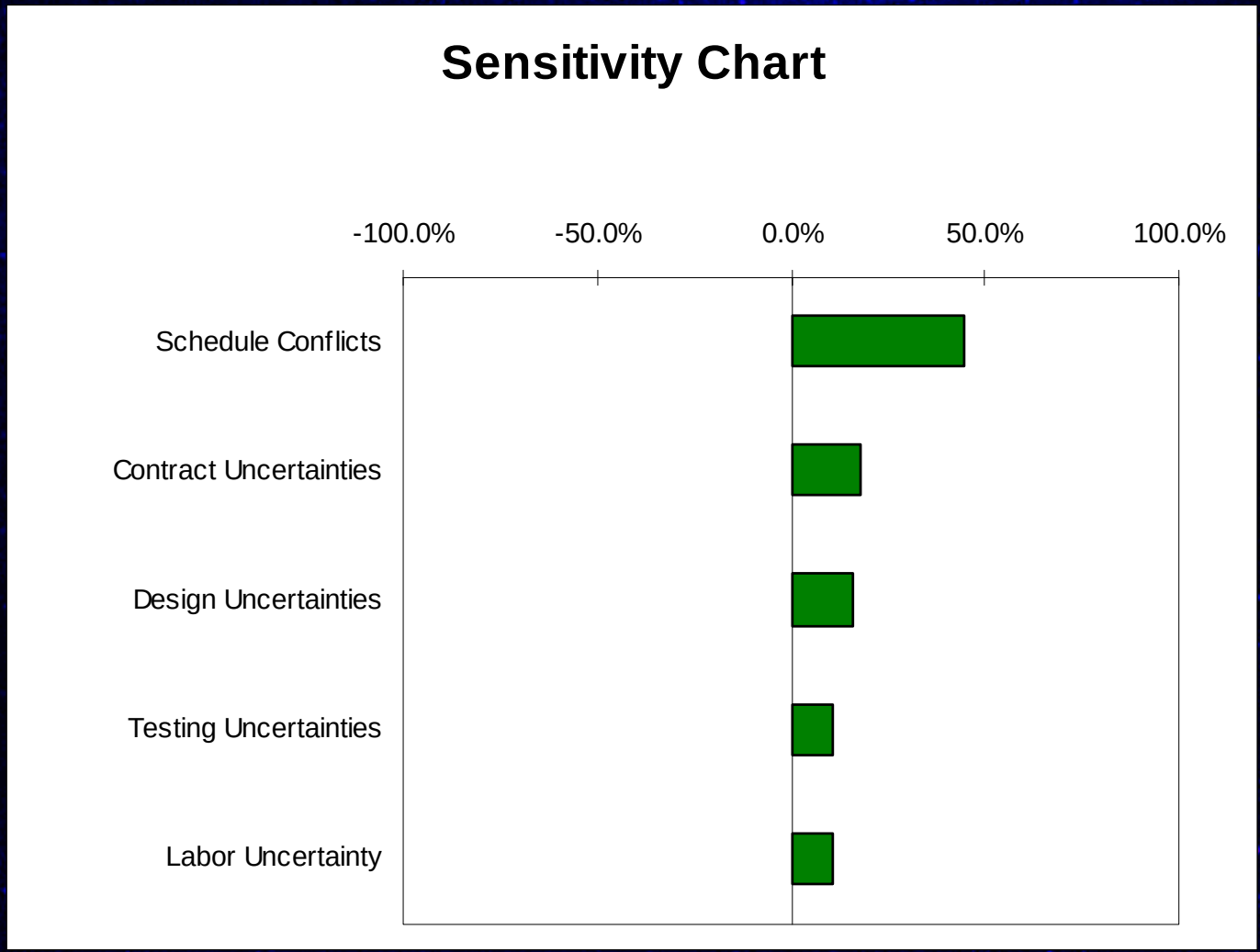


Using Results to Set Project Budgets

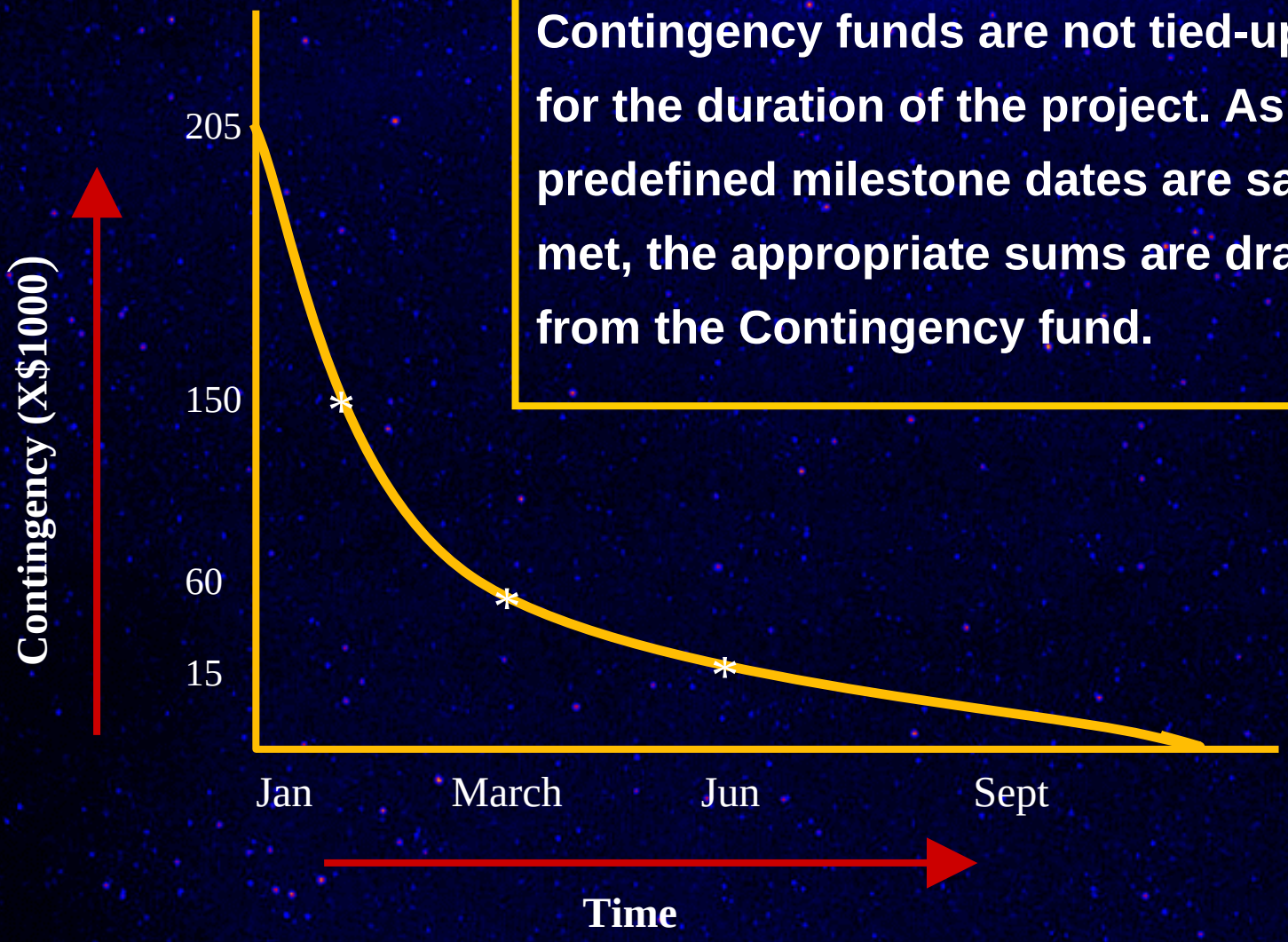
- Budget is usually set at P50 value
- Other probability values may be used
- Use the mean of the simulated costs

From a corporate portfolio viewpoint, the expected cost of a portfolio of projects is of more interest than the costs of the individual projects considered separately. Thus individual projects are considered at the mean of the simulated cost distributions.

Tornado Diagram



Contingency Drawdown Curve



Contingency funds are not tied-up for the duration of the project. As predefined milestone dates are safely met, the appropriate sums are drawn out from the Contingency fund.

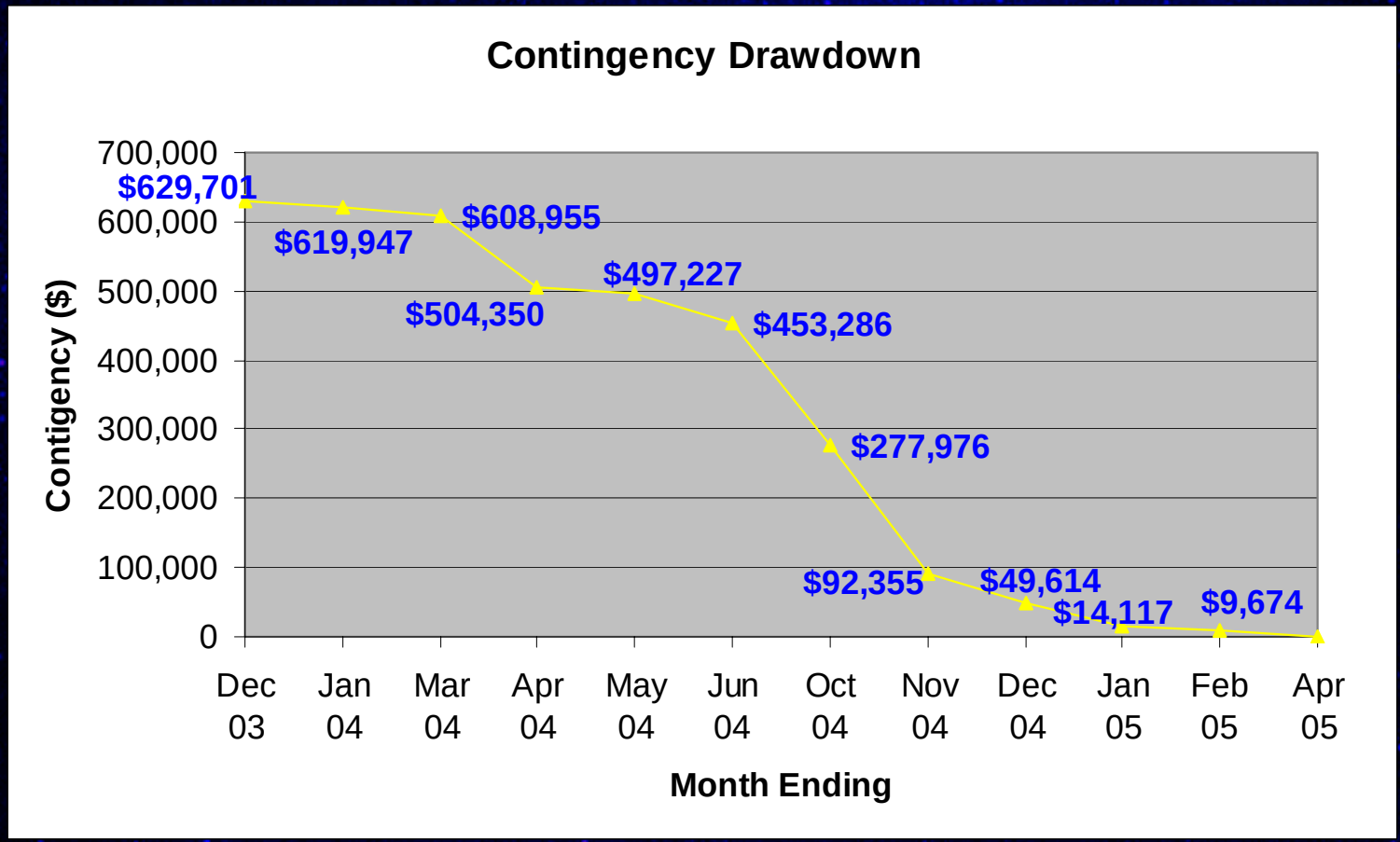
Results - Capacitor Bank Project

Base Cost Estimate	Post Peer Review Cost Estimate	Risk-Weighted Cost Estimate	Actual Final Project Cost
$408,000	$470,000	$529,000	$525,000

Major Risk Factors:

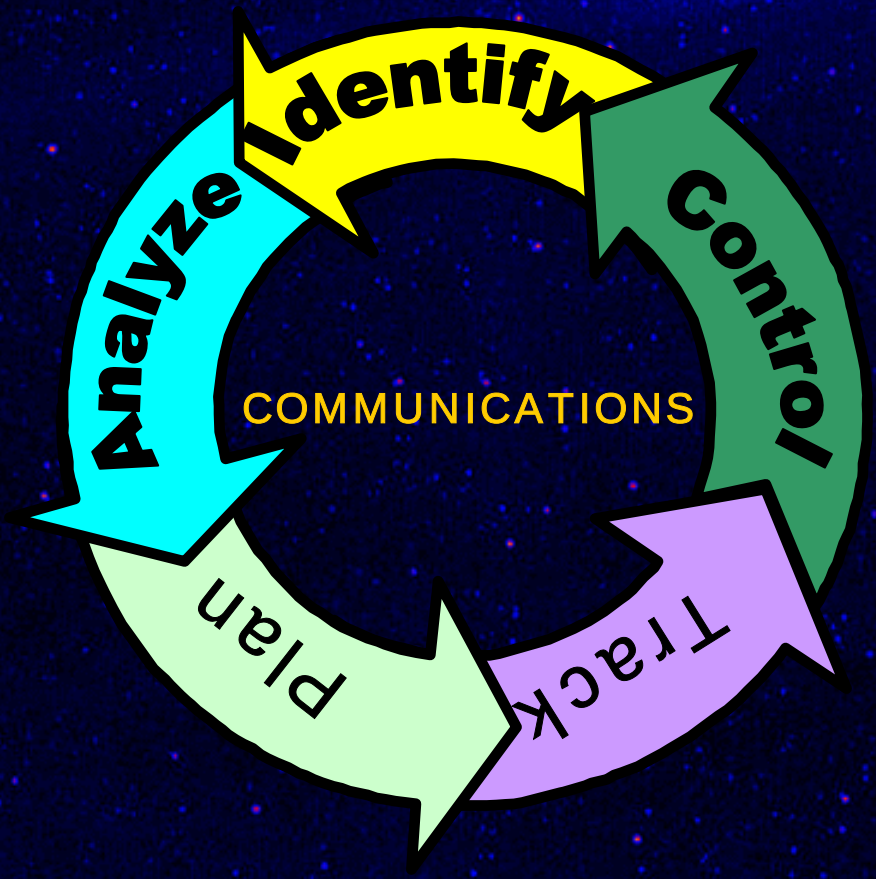
- Fault Current
- Mobile Transformer
- Cost of Additional Property
- Traps on Capacitor Bank to Block Carrier Signal
- Grounding Grid Additions

Results - City of Jonesboro, AR



Managing Contingency through DrawnDown Plots

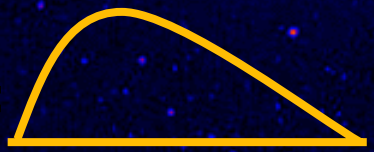
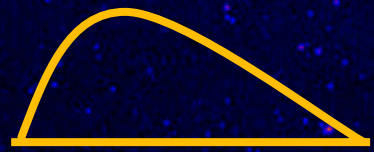
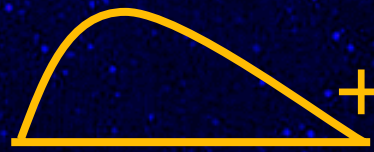
Funding For Continuous Issue and Risk Management



Contingency Funds are used to support Mitigation Tasks

Integrating Financial Risk Management with Project Risk Management

Business Decision Model

IRR =  +  +  + Other

CAPEX Revenue O&M Costs

Output from Risk-Weighted Cost Estimate Process

Initiate ◆ Define ◆ Design ◆ Construct ◆ Close Out

The Transmission Capital Process

Conclusions

- The Deregulated Electric Utility Marketplace has accentuated the need for effective Capital Stewardship
- The Risk-Weighted Cost Estimating technique has been effectively used to determine project budgets and contingency funds
- The continuous management of issues and risks is supported by the contingency funds
- Risk-Weighted cost estimates for projects provide an essential link between Project Risk Management and Financial Risk Management